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Towards an exploitation of IAGOS atmospheric composition measurements

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IAGOS, In-service Aircraft for a Global Observing System, has installed instrumentation on a growing fleet of commercial airliners in order to continuously monitor atmospheric composition around the globe. IAGOS is providing accurate in situ observations of greenhouse gases (GHGs), reactive gases, aerosols, and cloud particles at high spatial resolution in the free atmosphere, thereby covering the essential climate variables (ECVs) for atmospheric composition as designated by the GCOS programme (Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC, 2010). The greenhouse gas measurements made by IAGOS will be submitted to the WMO/GAW World Data Centre for Greenhouse Gases (WDCGG).

Within the EU FP7 project IGAS (IAGOS for the GMES Atmospheric Service), the links between this new data stream and scientific users, including the Copernicus Atmosphere Monitoring Service, are being improved. This includes the provision of measurements in both near-real-time and delayed mode, and improved accessibility to the data through linkages to the databases of both the German Aerospace Centre (DLR) flight campaign archive and the Copernicus data archive. Work has been undertaken to investigate the use of the near-real-time profile measurements in order to correct bias in satellite measurements assimilated by the Copernicus Atmosphere Monitoring Service. Documentation of the QA/QC procedures and measurement techniques for each instrument have been formalized and reviewed by external experts, to provide users with a measurement traceable to WMO standards. The representativeness of the measurements has been assessed, to better interpret results in polluted regions and near the tropopause. The potential impact of the GHG measurements on regional scale flux inversions has been quantified, which is relevant for ICOS (Integrated Carbon Observing System). Finally, tools have been developed to use the measurements for validation of satellite column measurements, including collocation with satellite soundings, extension of the profiles to the full column, and convolution with the relevant averaging kernel.

This presentation provides an overview of the activities undertaken in order to facilitate the use of the measurements provided by the IAGOS infrastructure. For more details, visit the websites www.iagos.org and www.igas-project.org.